

Chapter 10

RUNNING

Morning runs are such a staple of military life that to imagine daybreak without them is unthinkable for many soldiers. But is this the road to readiness or a path that steals valuable training time from strength and mobility?

SECTION I – BENEFITS AND RISKS OF RUNNING

10-1. It is no secret why the Army runs so much; running is the most efficient way to train the masses for aerobic conditioning. You form up, warm-up, do a right face, and off you go. Logistically, it is the easiest method of PRT. From a fitness and health perspective, the benefits of regular aerobic exercise are indisputable. Endurance is improved and disease risk is reduced.

10-2. However, running is not without risk. In units that emphasize running, the prevalence of foot pain, knee pain, and shin splints among soldiers is often unnecessarily high. The primary reasons for running injuries are:

- poor progression of a running program; running too much, too soon.
- too little recovery between bouts of running.
- excessive strain at certain joints and muscles due to biomechanical factors such as high/low arches, mal-alignment of the knees, muscular imbalances, and inadequate foot wear.

10-3. Units can greatly reduce the first two injury factors by following the phased training approach described in Chapter 2, Section I, and by following the sample schedules from Chapter 3. As for the third factor, installation experts such as physical therapists and sports medicine physicians may be able to assist units through programs such as shoe selection classes and biomechanical screenings.

10-4. The relationship between lower extremity injuries and running is well documented. A classic research study had one group run for 30 minutes, three times per week, at a given intensity (measured by heart rate). Another group also ran three times per week at the same intensity, but ran for 45 minutes. Through several weeks of such training, the group that ran for 30 minutes experienced less than half as many injuries as the group that ran 45 minutes, and yet their aerobic fitness improved just as much as the longer running group. By running less, 30 minutes versus 45, one group simply encountered the road less often. At a modest average of 60 foot strikes per leg per minute, a 45-minute versus 30-minute run will result in 900 more encounters with pavement for each foot. It's not surprising which group had more injuries.

10-5. If running injuries were simply the cost of doing business, they would be easier to accept. After all, soldiering is never found on the list of safe, comfortable occupations. But when we can buy just as much readiness at half the injury cost, we need to take a hard look at cashing in that coupon.

10-6. In addition to injuries, units that over-emphasize running risk leaving their soldiers unprepared for missions that require total readiness. Missions on urban terrain, for example, will often involve lifting/carrying heavy items, climbing, scrambling around debris and other rigorous physical tasks that are not developed through running.

SECTION II – THE RIGHT DOSE OF RUNNING

10-7. The word “dose” is used to suggest that exercise is like medicine in that both create physiological changes in the body that can help or harm. As we’ve discussed above, the wrong dosage of running, like the wrong dosage of medicine, often does harm. The right dose will prepare you for the APFT and your METL and then stop, no further running required.

10-8. To demonstrate the importance of choosing the optimal amount of running for your unit, imagine a not-so-hypothetical unit that has four PRT sessions per week. This unit will probably have about 150 minutes of actual conditioning time once you subtract preparation and recovery, and administrative announcements. If 120 minutes per week are spent running (30 minutes per day times 4 days), only 30 minutes are left for other training. Normally, this time would be spent on push-up and sit-up improvement. The dominant mode of training for this unit, running, will train their leg muscles to contract slowly and rhythmically. How would such a unit score on METL tasks such as casualty evacuation and individual movement techniques, which require strength and mobility? They could not be expected to do as well as if their PRT program involved less distance running and included a wide range of events that developed strength, speed, agility, balance, and power. PRT events that develop these attributes, such as calisthenics, movement drills, dumbbell drills, and medicine ball activities train the muscles to contract quickly and forcefully and, therefore, more closely mimic essential soldier tasks.

10-9. The purpose of distance running for most Army units will be to prepare for the APFT. Although it is difficult to precisely predict how much running is necessary to obtain a particular score on the APFT, certain facts will influence the type and amount of training. First, consider that the APFT 2-mile run uses both the aerobic and anaerobic energy systems, with the aerobic system contributing slightly more. This still leaves the anaerobic system accountable for a good deal of the success in racing the 2-miles. Therefore, anaerobic training becomes an important part of preparing soldiers to do well on this event. The running activities described in Section III develop both energy systems. By using these activities in accordance with the sample schedules in chapter three, units can ensure they are prepared for the endurance demands of both the APFT run and their METL.

10-10. Some schools and units have a distance running standard greater than the APFT two-mile run. Usually the distance is four or five miles at an

eight to nine-minute per mile pace. If you are preparing for an assignment to one of these schools or units you should run more than if you were just preparing for the APFT, although there is no need to run more than 3 times per week. In addition to interval training and fast-continuous runs, you will need a weekly slow-continuous run (SCR) that is geared toward increasing distance over time. See paragraph 10-14 for more information on SCRs. Allow yourself plenty of time to progress to the higher standard. The distance of the long run should not progress more than 10% per week. Though there is a temptation to run every day to prepare for the higher standard, that often produces injuries instead of better performance. With enough time and the right training, most soldiers are capable of meeting the higher standard.

SECTION III – PRT RUNNING ACTIVITIES

ABILITY GROUP RUN (AGR)

10-11. Grouping soldiers by ability for running activities avoids the potential problems of unit runs, fast runners “smoking” (and potentially injuring) slower runners who can’t keep up, and slow runners holding back faster runners from achieving a conditioning effect. The key to making ability group runs work is having enough group leaders to ensure that each group of runners is relatively equal in ability. Two-mile run times for group members should be as similar as possible (a range between the fastest and slowest runners of less than one minute is ideal). Group leaders must understand pacing and be attentive to the fatigue status of the group throughout the run.

10-12. While monitoring heart rate can be beneficial for individuals, Army units must rely on the judgment of exercise leaders to ensure that the proper intensity is being applied. It is impractical for soldiers on an AGR to stop to get their heart rates. What does it matter if a soldier’s heart rate is above or below their target rate? They are not going to speed ahead of the group or fall back just to put their heart rate within the target range. It is the responsibility of the group leader to establish a pace that is appropriate for the group as a whole.

FAST-CONTINUOUS RUN (FCR)

10-13. The FCR is performed in ability groups. In the civilian community, it is commonly referred to as a tempo run. The purpose of the FCR is to train the body to sustain a challenging pace. To perform a FCR, start with 5-10 minutes at an easy pace, 15-20 minutes at a challenging pace, and 5 minutes of easy running to finish. The pace for the FCR is slower than the 2-mile race pace, generally, 30-40 seconds per mile slower than the 2-mile race pace. At this pace, singing cadence is inappropriate. FCRs for units must be performed in ability groups. As with scheduling intervals, one tempo run per week is sufficient. However, since many units will want to run three times per week, two tempo runs is fine. Note that the sample schedules from Chapter 3 list only AGRs and not FCRs. This is to allow group leaders the

flexibility to choose a FCR or a SCR to best meet their needs for a particular day's training.

SLOW-CONTINUOUS RUN (SCR)

10-14. The SCR may be performed in ability groups or with unit integrity. The purpose of the SCR is to build aerobic endurance and gradually toughen the tissues of the legs to tolerate long duration events. The pace is slow, generally about two minutes per mile slower than your 2-mile race pace. Singing cadence should not be difficult at this relatively easy pace. Because the SCR is time-consuming, raises the injury risk, and offers essentially no anaerobic benefit, they should be limited to occasional unit runs, toughening phase runs for the those individuals just starting or returning to a running program, and runs for those individuals preparing for schools or units that have a distance running standard of four miles or greater.

30/30S

10-15. The purpose of the 30/30 run is to provide a high-quality training stimulus in a short period of time with relatively little need for recovery. These runs train the anaerobic energy system, but should not create excessive fatigue. The 30/30 run is named for the run/rest ratio (30 seconds of relatively hard running, 30 seconds of walking is one repetition). The pace for the running phase should be about 70% of your maximum speed, not maximum heart rate. To determine your proper pace (70% of maximum) for 30/30s, run at maximum speed for 200 meters (half a lap on a standard 400 meter track). The time it takes to complete the 200 meters is then used as the basis for determining your 70% effort. For example, using the chart in Figure 10-1, a runner that completes 200 meters with a best effort of 30 seconds would then practice running the same 200 meter distance in 39 seconds to get an ideal of what 70% effort feels like. Once the runner has a feel for the 70% pace, they can then begin 30/30 training, 30 seconds of running at 70% max effort followed by 30 seconds of walking. The running portion of the 30/30s should feel like a hard effort that falls considerably short of a full-out sprint. Concentrate on running with good form by keeping the head up, shoulders relaxed, trunk directly over the pelvis, and arm swing moderate and in line with the direction of travel. See Section IV - Running Form for more details. These runs should not leave you exhausted. If they do, make them 20/30s (less run time) or 30/40s (more walk time). Start with 4-5 repetitions and progress gradually to no more than 10-12. Schedule 30/30s IAW the sample schedules from Chapter 3.

200 Meter Best Time (sec)	70% effort (sec)
22	28-29
23	30
24	31
25	32-33
26	34
27	35
28	36-37
29	38
30	39
31	40
32	41-42
33	43
34	44
35	45-46
36	47
37	48
38	49-50
39	51
40	52
41	53
42	54-55
43	56
44	57
45	58-59

Figure 10-1 Calculating 30/30 Pace

INTERVALS

10-16. Running faster than the body is accustomed to is the key to improving two-mile run times. If all you ever do is run at a comfortable pace, you will not improve your ability to run faster. Intervals are a way of structuring a run so that much of the session is ran at a pace faster than the two-mile race pace. The most tried and true method of training the anaerobic system for the two-mile run is interval training. Perform interval training as follows:

- Perform Calisthenic and Movement Drills IAW the sample schedules in Chapter 3 to serve as preparation for intervals.
- Identify group leaders and have soldiers fall-in on their group leader based on two-mile run times.
- Begin the run with a $\frac{1}{2}$ mile (two laps of a $\frac{1}{4}$ mile track) of easy running.
- At a specified point (goal post, goal line, 50-yard line, etc) soldiers begin their first interval by breaking into their fast-lap pace (5-7 seconds per $\frac{1}{4}$ mile faster than the two-mile pace). Though soldiers will be in ability groups and, thus, running similar speeds, they should not stay together as a group, this is an individual pace. Encourage soldiers to avoid the temptation of running this lap too fast, the pace is just a bit faster than

their two-mile run pace. Figure 10-2 describes how to calculate interval paces from soldier's 2-mile run times.

- At the end of the $\frac{1}{4}$ -mile, return to a very easy pace and gather as a group. This slow lap is still part of interval number one. During this $\frac{1}{4}$ -mile recovery, the group leader should ask the soldiers if they finished the fast lap in their target range. The slow lap should last twice as long as the average fast-lap pace. For example, if the fastest runner's fast-lap pace was 1:30 and the slowest runner's was 1:40, the average is 1:35. The slow-lap pace should be two times the average, or 3:10.
- Start with four intervals and progress by one repetition each week until performing eight repetitions. Each ability group will consist of soldiers at various stages of interval training. For example, an individual progressing from the toughening to conditioning phase will be performing intervals for the first time, while others in the group will have been doing intervals for several weeks. The soldier new to interval training will fast walk after completing four intervals, while the rest of the group continues up to eight repetitions. The following week the soldier will stop at five intervals, then six, etc.
- Recover from interval training IAW the scheduled activities from Chapter 3.

10-17. Schedule interval training no more than once per week. While the instructions above describe $\frac{1}{4}$ mile intervals, $\frac{1}{2}$ mile intervals may be substituted occasionally for variety and a slightly different training effect. For $\frac{1}{2}$ mile intervals, the fast phase (two laps on a $\frac{1}{4}$ mile track) should be run at a pace that is 3-5 seconds faster than the two-mile race pace. The recovery phase ($\frac{1}{4}$ mile) should equal the time spent running the fast lap. A unit accustomed to running eight $\frac{1}{4}$ mile intervals should run only four $\frac{1}{2}$ mile intervals. Though interval training is most appropriate during an 8-10 week period leading up to a race, it can be a regular part of the PRT schedule throughout the year.

Step 1: Using the most recent 2-mile run time, determine the 1-mile race pace by dividing by two.

For example, if the 2-mile run time was 15:53, the 1-mile pace is $7:30 + 26.5 = 7:56$.

Step 2: Using the time from step 1, determine the time it took to run a $\frac{1}{2}$ mile by dividing by two.

$7:56 / 2 = 3:30 + 28 = 3:58$. When performing $\frac{1}{2}$ mile intervals, the fast phase in this example would be run at a 3:53–3:55 pace (3-5 seconds faster than 2-mile run pace). The recovery phase consists of covering a $\frac{1}{4}$ mile (half the distance) in the same amount of time (3:53–3:55).

Step 3: Using the time in step 2, determine the time it took to run a $\frac{1}{4}$ mile by dividing by two. $3:58 / 2 = 1:30 + 29 = 1:59$. When performing $\frac{1}{4}$ mile intervals, the fast phase in this example would be run at 1:52-1:54 (5-7 seconds faster than 2-mile run pace).

Figure 10-2 Calculating Interval Times

FARTLEK RUN

10-18. The word Fartlek means “speed play.” Essentially, this means running fast until you begin fatiguing, then slowing the pace to recover, then repeating for the duration of the run. This type of running is similar to intervals in that the intensity of effort is varied. However, unlike intervals, Fartlek runs do not use precise periods of fast and slow running, but instead use the judgment of the group leader to guide changes in intensity. After the scheduled preparation activities, the unit forms in ability groups. The group leaders set an easy pace for five minutes to serve as further preparation, then increase the tempo to a challenging pace. This faster pace should be held for 30 seconds to three minutes. The group leader must understand the relationship between intensity and duration. When choosing longer intervals of fast paced running, the pace will need to be less intense. When choosing shorter intervals, the pace may be quite challenging. The recovery periods must also be well-regulated by the group leader. They must be attuned to the effort they are demanding from their soldiers and use recovery periods in such a way that group integrity and running form are maintained during the faster paced portions of the Fartlek run. Because these runs are similar to interval training, they are a natural replacement on the PRT schedule for units that choose to take a break from weekly interval training.

LAST-MAN-UP

10-19. This technique mixes steady paced running with short sprints. It is most appropriate for squads or sections due to the movement within the formation. During a continuous run of moderate intensity, the group leader instructs the last runner to sprint to the front of the formation. Once at the front of the formation, the soldier then resumes the steady pace of the group. The leader then gives the command for the next soldier to move forward. The leader must ensure the steady pace of the group to allow adequate recovery from the sprints. The leader must also ensure an appropriate distance between soldiers.

TERRAIN RUN

10-20. To add more realism to running, terrain runs should be a regular feature of unit PRT. Running through fields and forests, over hills and around obstacles improves mobility as well as endurance. Because distances should generally be short, they can be combined with other training activities. See the sample schedules in Chapter 3 for examples of how to combine terrain runs with other training activities. Though terrain runs will stimulate balance and agility to a much greater degree than road running, they can also provide a greater stress to certain joints and muscles of the legs. To avoid injury, care must be taken to progress these runs appropriately. Even runners that log high mileage on the road should start terrain running for a short distance (less than one mile) and progress no more than 5-10 percent per week. Soldiers should perform terrain runs in well-fitting boots, but should limit the distance to 1-2 miles.

HILL REPEATS

10-21. Hill repeats are an effective means of developing explosive leg strength and anaerobic endurance. To prepare to conduct this activity, perform Calisthenic and Movement Drills. Next, run at a steady, comfortable pace for at least five minutes. At the hill, the intensity and duration of the repetitions will depend on the characteristics of the hill. For example, a short steep hill is ideal for explosive efforts that last from 15-30 seconds. Jog back down very slowly, allowing 45-90 seconds of recovery. Long, gentle slopes are best for sustained efforts of moderate intensity. Because the intensity of the effort is less than that for steeper hills, the recovery period can be reduced to 1-2 times the duration of the uphill run. It is important to maintain good form during hill repeats. Resist the urge to lean excessively forward and instead maintain the body perpendicular to level ground. On steep hills, the knees will need to rise higher than normal to permit a full stride. As with other forms of intense running, start with just a few repetitions and add one or two on subsequent sessions. Hill Repeats should be performed no more than once per week.

UNIT RUN

10-22. Unit, or cohesion, runs are organized not by ability but by platoon, company, battalion, etc. The pace should be kept slow enough and the distance short enough to limit fall-outs. Keeping a large unit in step, with proper distance intervals, and correct running form offers intangible benefits that commanders desire. Though they provide a snapshot of the discipline, motivation, and aerobic fitness of the unit as whole, because of the drawbacks to unit runs mentioned in paragraph 10-11, they should be scheduled no more than once per month. Commanders should use AGRs and intervals as the staples of their running program to maximize the training effect for all soldiers.

SECTION IV –RUNNING FORM

10-23. Most discussions of how to improve running center around various workouts designed to improve speed. Often overlooked, however, is the efficiency of the running form itself. Since running form among elite runners can vary significantly, there is a tendency to let the individual find a gait to their liking and leave it alone. Indeed, running is a very fluid, natural act that may be inhibited by over-analysis. However, there are several things runners can do to improve their efficiency without overhauling their natural style. Most runners will find one or two points on which they can improve.

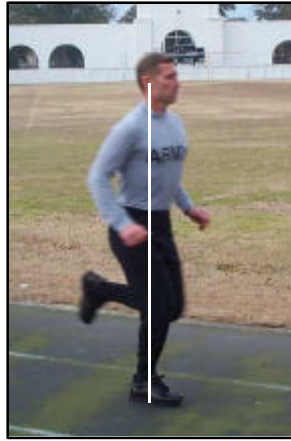


Figure 10-2 Running Form

HEAD

10-24. The head should remain over its base of support, the neck, with the chin neither pointing up or down. Allowing the head to ride forward puts undue strain on the muscles of the upper back.

SHOULDERS

10-25. The shoulders should assume a neutral posture, neither rounded forward or forcefully arched backward. Rounding the shoulders forward is the most common fault in everyday posture as well as with running. This is usually associated with tightness of the chest and shoulders. Another problem occurs when the shoulder girdle starts to rise with fatigue or increased effort. This position not only wastes energy, but can also adversely affect breathing.

ARMS

10-26. Throughout the arm swing, the elbows should stay at roughly a 90-degree bend. The wrists stay straight and the hands remain loosely cupped. The arm swing should be free of tension, but do not allow the hands to cross the midline of the body.

TRUNK AND PELVIS

10-27. Like the head, the trunk should remain over its base of support, the pelvis. A common problem with fatigue is allowing the trunk to get in front of the legs and pelvis. This forces the lower back muscles to spend too much energy resisting further trunk collapse to the front.

LEGS

10-28. For distance running, much of the power comes from below the knee. Energy is wasted as the knees come higher and the big muscles around the hips and thighs get involved. Practice getting a strong push-off from the

ankle of the back leg. This helps to naturally lengthen the stride. Lengthening the stride by reaching forward with the front leg will be counterproductive.

FEET

10-29. For most soldiers, the feet should be pointing directly forward while running. With fatigue and certain muscle imbalances, the legs and feet will start to rotate outward. This hinders performance and may create abnormal stresses that cause injury. Refer to the Shoe Selection article on the USAPFS website for detailed information on the biomechanics of the feet and the best means of choosing a running shoe.

SECTION V - SUMMARY

10-30. It is likely that distance running, the centerpiece many PRT programs, is providing a false sense of physical readiness. Anyone able to routinely run three or four miles in the morning and then work all day would seem to have admirable endurance. But the endurance requirements of soldiers are different. They are commonly called on to sustain challenging physical operations for extended periods of time. The demands on the body are often very taxing on the metabolic, neurological, muscular, and skeletal systems. Distance running alone provides soldiers very limited preparation to meet these demands. To ensure the physical readiness of their soldiers, commanders and PRT leaders must offer running programs that develop the type of endurance demanded of their mission.